requests for additional capability for l3 muon filtering

- scintillator timing cut
  - adds additional rejection for IMU muons
    - lower COT track quality
    - not known to be needed for CMX, CMP...
- CMUP+BMU stub
  - soft muon flavor tag (Jones, Usynin, Wickland)
  - CMUP4+BMU stub w. scintillator+???

scintillator timing cut

- the really slick minimalist approach
  - adjust the various detector t_0s so the hits from real muons come at the same time
  - then count #hits in some time window
    - muon→stub→scintillator hits
    - e.g. some function call

```
if (NoScint(tmin, tmax).ge.1)
    Pass=.true.
```

  - only complication is that we want to require TSU for rear BMU muons
- it still works I think
  - BMU front requires ≥1
    - presumably 1 BSU
    - so what if it's not, just take the trigger and run
  - BMU rear requires ≥2
    - presumably 1 BSU+1 TSU (same comment)
- but this is probably too elegant to last forever or maybe the UW folks will say it just doesn't work (e.g. BSU/TSU spectra widths different)

scintillator timing cut

- a slightly more complicated approach
  - t_0 adjustment optional
  - count #hits from a detector in some time window
    - muon→stub→scintillator hits→detector type
    - e.g. some function calls

      ```
      if (NoBSU(tmin,
          tmax).ge.1) Pass=.true.
      ```

    - 1 set of parameters per detector is only slightly more complicated
    - would allow a hadron TDC cut down the road
- what is required and from whom
  - from the detector people, the time cuts (t_0s if needed)
  - from this group, the function calls, calibration mods for t_0
  - from the muon l3 filter maintainer, the implementation of the cuts
    - put in CSX (probably), CSP (?)

issues, questions, comments

- should we require 1 and only 1 hit
  - no, change in rate negligible
- hadron TDC cut
  - an enhancement down the road for the rear where the track is a piece of crap
    - draw a line from z0 to the stub
    - look for a matching hit
    - treat as any other scintillator timing cut
  - not needed in the central (good track)

CMUP+BMU stub

- I understand that Dan Cyr has code which does a BMU stub + tight timing cut
- I propose that the proponents turn this into an L3 filter that does what they want
  - this then runs as a pass after the standard l3 muon filter which is used to select the CMUP muon
  - quick and dirty, not general purpose
  - we have to do nothing